9-14-00 Linda B

SPECIFICATION

To All Whom It May Concern:

Be It Known That I, LOUIS BROWN ABRAMS, a citizen of the United States, resident of the County of Larimer, City of Fort Collins, State of Colorado, whose post office address is P.O. Box 41, Fort Collins, Colorado 80522-0041, have invented new and useful improvements in

FLOCKED TRANSFER AND ARTICLE OF MANUFACTURE INCLUDING THE FLOCKED TRANSFER

CROSS-REFERENCE TO RELATED APPLICATIONS

Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable.

BACKGROUND OF THE INVENTION

This invention relates to flocked transfers, and, in particular, to an improved method of making flocked transfers which can reduce the cost and time required of producing transfers by a significant amount.

Heretofore, flocked transfers have generally been produced by applying a release agent to a release sheet. The flocking is applied to the release sheet in the desired pattern. A binder and a permanent hot melt adhesive are applied to the back of the flocking, and the transfer is allowed to dry. The binder is required hold the flocking in the desired pattern. The hot melt adhesive, which is applied to the transfer as a powder, is used to adhere the transfer to a substrate, such as an article of clothing, a neoprene pad, etc. The transfer is applied to the substrate by placing the transfer on the substrate with the dried hot melt adhesive in contact with the substrate. Heat, such as from an iron, is then applied to the release sheet. The heat melts the hot melt adhesive to cause hot melt adhesive to flow into intimate contact with the substrate, forming a mechanical and molecular bond with the substrate. The release agent then allows for the release sheet to be removed from the transfer, leaving the flocking exposed on the substrate.

This traditional method has worked well for years. However, the method can be improved upon to reduce the cost of producing the transfer, and hence, the cost of the item containing the transfer.

BRIEF SUMMARY OF THE INVENTION

In accordance with the invention, generally stated, a flocked transfer of the present invention is produced by applying a release agent to a release sheet and then applying the flocking to the release agent. Unlike the traditional method, a binder and adhesive are not applied to the ends of the flock.

To form an article of manufacture with the flocked transfer, a hot melt film (in the form of a sheet or cut to shape) is positioned on the substrate to which the transfer is to be applied. The hot melt film is preferably a polyester or polyurethane film, but can be any thermosetting film. The flock with the release adhesive and release sheet (i.e., the transfer) is then placed on the sheet of hot melt film with the release sheet up, so that the flocking is in contact with the hot melt film. Heat is then applied to the transfer. The heat melts the hot melt film, and secures the flock to the substrate. Because the film is thermosetting, even if it is subsequently subjected to heat, it will not remelt, nor become tacky, and hence, there is no risk of fibers becoming matted down in any of this type of adhesive, which could otherwise ruin the plush pile effect. In addition, it is likely that the use of a thermoset powder could be added to a bond print latex flock adhesive binder, to serve as a method for increasing the adhesion and again reducing the risk of any remelting, or becoming tacky, when the flock transfer is subsequently exposed to heat. It is known that there is a much stronger adhesion with thermosetting materials, because thermoset materials will cross-link with a chemical reaction and thereby adhere the flock fibers to it, which become chemically attached thereto. Through the usage of this invention, the finished flock surface is more plush, soft, because more of the fiber is exposed and extends upwardly out of the adhesive, than with the screen-printed latex, as currently used. Also, this affords better soil release during washing or cleaning because of less fiber/adhesive entanglement occurs with the flock, during application.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

FIG. 1 is a cross-sectional view of a prior art flock transfer;

FIG. 2 is a cross-sectional view of a flock transfer of the present invention;

FIG. 3 is an exploded view of the transfer, a hot melt sheet, and a substrate used to make an article of manufacture;

FIG. 4 is a cross-sectional view of an article of manufacture using the transfer of the present invention, showing a part of the transfer applied to part of the substrate and a part of the transfer and hot melt film spaced from the substrate; and,

FIG. 5 is a schematic drawing of a process for continuously producing articles of manufacture, such as mouse pads, coasters, etc.

Corresponding reference numerals will be used throughout the several figures of the drawings.

DETAILED DESCRIPTION OF THE INVENTION

The following detailed description illustrates the invention by way of example and not by way of limitation. This description will clearly enable one skilled in the art to make and use the invention, including what I presently believe is the best mode of carrying out the invention.

A prior art flocked transfer 101 is shown in FIG. 1. As is known, such transfers include a dimensionally stable release sheet 103 to which a conventional flock transfer release adhesive 105 is applied in a pattern which corresponds to the overall image to be flocked. The flock 107 is then electrostatically coated into the release adhesive 105. A binder adhesive 109 is applied to the exposed ends of the flock to bind the flock together as a unit. Lastly, a hot melt adhesive 111 is applied. The transfer is then allowed to dry. The transfer is applied to a substrate, as is known, by positioning the transfer on a substrate, such as a shirt or other item of clothing, with the hot melt

adhesive in contact with the substrate, and applying heat to the transfer. The heat activates the hot melt adhesive to adhere the transfer to the substrate. This process is described in my prior patent, U.S. Pat. No. 4,810,549, as well as in my co-pending application, Ser. No. 09/548,839 filed April 13, 2000, both of which are incorporated herein by reference.

A flocked transfer 1 of the present invention is shown in FIG. 2. The transfer 1 of the present invention includes a release sheet 3 to which a conventional release agent 5, such as wax, has been applied. The release agent is applied to the sheet in the shape of the pattern of the flocking. Flocking 7 is then applied to the release agent, and hence to the release sheet, to form the transfer. The flocking 7 is applied, for example, in the manner as described in my prior patent, U.S. Pat. No. 4,810,549, which is incorporated herein by reference. Unlike the prior art processes, the transfer 1 is made without the use of a binder adhesive or a hot melt adhesive. As is discussed below, a thermosetting film is used to adhere the transfer to a substrate.

An article of manufacture, such as an item of clothing having a transfer 1 applied thereto, a mouse pad, coaster, or other item having a flocked surface is easily produced using the transfer 1. The article of manufacture 11 is produced by positioning a hot melt sheet 13 between a substrate 15 and the flocked release sheet. The hot melt sheet is, for example, a sheet of thermosetting polyester, available from Bostik, Inc. The hot melt sheet can also be made from a thermosetting polyurethane. Any other thermosetting film should also work well. The substrate can be an item of clothing, a rubber pad (for producing a mouse pad or coaster), etc. The hot melt sheet can be precut to correspond to the shape of the transfer 1. The transfer 1 is then positioned on the hot melt sheet with the flock 5 against the hot melt sheet 13. Heat is applied to the transfer through the release sheet to activate the hot melt sheet. The hot melt sheet then acts to

both bind the flock 5 together and to adhere the flock 5 to the substrate 15. Preferably, to assemble the article, the flocked release sheet, the thermosetting film, and the substrate are brought together and passed through a heat-laminating press where the three parts are subject to temperature of about 300°F (about 150°C) and pressure (about 40-50 psi) for about 30 seconds. It has been found that a medium-to-firm pressure has been most advantageous in providing for assembly of this type of plush flocked transfer. The pressure and heat will cause the hot melt film to adhere to the flock and the substrate. Additionally, the hot melt film will cross-link or cure, to give a strong attachment of the flock to the substrate.

Articles, such as mouse pads or coaster, in which the entire top surface of the article is covered with the flocking can be produced on a continuous basis, as shown in FIG. 5. Rolls 21, 23, and 25 of a flocked release sheet 1, the hot melt film 13, and the substrate 15 are provided. The three parts are brought together at a laminating station 33. Rollers can be provided in front of the station 33 so that the three elements are adjacent each other as they enter the laminating station. In the laminating station, heat and pressure are applied to the three sheets (the flocked release sheet, the hot melt film, and the substrate) to melt the hot melt film. The melted hot melt film will then cure or cross-link, as noted above, to adhere the flock to the substrate. A web 35 exits the laminating station. The web 35 is then allowed to cool. The web 35 is ultimately directed to a cutting station where it is cut into individual articles. Once the web 35 is cooled, it can be directed immediately to a cutting station (after the sheet 35 cools), or can it can be wound up on an uptake roller to be cut into individual articles at a later time, or at a different location. At the cutting station, the release sheet is removed from the flock and gathered on an uptake roll or is otherwise disposed of. After the release sheet has been removed from the flock, the substrate with the flock adhered thereto is

cut to form the articles 11. It is also likely that one could remove the release liner either before or after the die cutting procedure.

Preferably, the release sheet is flocked and supplied in roll form as shown in FIG. 5. However, the flocking of the release sheet could be made part of the process.

To produce flocked articles, such as shirts, jackets, etc., which cannot be easily flocked on a continuous basis, the hot melt sheet can be applied to the transfer 1 prior to applying the transfer to the substrate. To do this, the thermosetting hot melt film is placed in contact with the flock of the transfer, and the transfer and release sheet are heated to a temperature at which the thermosetting hot melt film become tacky, but below the temperature at which the thermosetting hot melt film begins to cure and cross-link. This will adhere the thermosetting hot melt film to the transfer 1 to form a transfer which can later be applied to an article by positioned the transfer with the hot melt film in position on the article (i.e., piece of clothing) and applying heat and pressure to the transfer, for example, with an iron, sufficient to melt the hot melt film, to cause the hot melt film to cure and cross-link.

The method eliminates two steps from the prior art method: (1) application of the binder adhesive and (2) application, cleaning, sintering, and drying of the hot melt adhesive. In a continuous process, the present method also eliminates a station for applying the binder and hot melt adhesives as well as a station for drying the completed transfer. Because a station is not needed to apply (i.e., print) the binder and hot melt adhesives to the flocking as part of the transfer, the machinery required to produce the article 11 is much less expensive (both in actual costs and in maintenance costs). Additionally, because the binder adhesive and hot melt adhesive is not used, the cost of the article of manufacture is significantly reduced.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.